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Taxonomy and Distribution of Japanese *Phyllanthus* (Euphorbiaceae)

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Keys, descriptions, taxonomical notes, and distribution maps are presented for the Japanese *Phyllanthus* which consists of 12 species belonging to four subgenera (*Kirganelia*, *Eriococcus*, *Phyllanthus*, *Isocladus*). A new subspecies, *P. oligospermus* Hayata subsp. *donanensis* T. Kuros., is described from Yonaguni Island in the Ryukyus. Two tropical or subtropical herbs, *P. embergeri* Haic. & Rossign. and *P. urinaria* L. subsp. *nudicarpus* Rossign. & Haic., are newly reported from Japan. The name, *P. lepidocarpus* Siebold & Zucc. (1845), is prior to *P. hookeri* Müll. Arg. (1863).

Key words: Distribution, Euphorbiaceae, Japan, *Phyllanthus*, *Phyllanthus lepidocarpus*, *Phyllanthus oligospermus* subsp. *donanensis*, Taxonomy.

The Euphorbiaceae is one of the largest families of angiosperms with about 8000 species in more than 300 genera (Webster 1987, 1994b) and is known as a taxonomically and systematically poorly studied family because of its mainly tropical distribution and minute flowers (Webster 1987, 1994a). The Japanese taxa also need taxonomical revision as pointed out by Ohba (1989). At present, I am revising Japanese *Phyllanthus* L. which includes several misunderstood species, from taxonomical and biogeographical points of view.

The first critical examination on Japanese *Phyllanthus* was made by Hayata (1904). He described two shrubby species (*P. flexuosus* and *P. liukiuensis*) and three herbaceous species (*P. niruri*, *P. lepidocarpus* as *P. urinaria*, and *P. ussuriensis* as *P. matsumurae*) from Japan (Hokkaido to Ryukyu), although his report contained a few taxonomic confusion; *P. niruri* appears to be a confusion with *P. ussuriensis*. After Hayata (1904) our knowledge on the flora of the Ryukyus and the Ogasawara Islands increased, and a tropical shrub, *P. reticulatus*, and three tropical herbs, *P. amarus*, *P. debilis* and *P. simplex* have been reported by various authors (Nakai 1912; Masamune 1955; Hatusima & Amano 1958; Murata 1958). I (Kurosawa 1999) have recently enumerated these eight species and a newly naturalized herb (*P. tenellus*). After the paper was published, however, another new shrub (*P. oligospermus* subsp. *donanensis*) and two herbs (*P. embergeri* and *P. urinaria* subsp. *nudicarpus*) have just been discovered from the Ryukyus. In this paper, these taxa are firstly reported and keys, taxonomical notes, and distribution maps are presented for the Japanese *Phyllanthus*. Naturalized species of which descriptions were not presented in Kurosawa (1999) are also described.

In Japan, *Phyllanthus* is composed of 12 species which assigned to four subgenera (*Kirganelia*, *Eriococcus*, *Phyllanthus*, *Isocladus*). Three endemic taxa have relatives in Southern

China and/or Taiwan. Most of the non-endemic and non-introduced taxa are considered to be elements of tropical Asia. *Phyllanthus ussuriensis* is the only species occuring widely in cool temperate zone of East Asia. Herbaceous taxa more or less show weediness, and *Phyllanthus lepidocarpus* is known as a common weed in southwestern Japan. The other Japanese species are not conspicuous components of the vegetation. Most species of Japanese *Phyllanthus* appear to have a less economic importance, although *P. reticulatus* is sometimes planted around crop fields as a windbreak in the Ryukyus. *Phyllanthus liukiuensis* and *P. oligospermus* subsp. *donanensis* are considered to be threatened plants of Japan because of their small population size.

Key to the species of Japanese *Phyllanthus*

A. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes)

B. Shrubs, subshrubs, or herbs; fruits baccate or capsular, pedicels 4–14 mm long; seeds smooth or tuberculate, not ridged or ribbed

C. Shrubs or herbs; sepals entire; fruits baccate or capsular (Subgen. I. Kirganelia)

D. Shrubs, 1.3–4 m tall; fruits baccate

E. Stamens 2–4; ovary 3-carpeled; styles 1–3 mm long; pedicels of bacca 4–14 mm long

F. Stamens 2(–3); male sepals dark red; styles entire, 1–1.5 mm long .... 1. *P. flexuosus* (Siebold & Zucc.) Müll. Arg.

F. Stamens (2–)3–4; male sepals yellowish green; styles entire or bifid, 2–3 mm long ......2. *P. oligospermus* Hayata subsp. *donanensis* T. Kuros.

E. Stamens 5; ovary 5 to 10-carpeled; styles ca. 0.3 mm long; pedicels of bacca 4–5 mm long ....3. *P. reticulatus* Poir.

D. Herbs, lower than 1 m; fruits capsular ....4. *P. tenellus* Roxb.

C. Subshrubs, lower than 1 m; sepals irregularly toothed; fruits capsular (Subgen. II. Eriococcus) .... 5. *P. liukiuensis* Hayata

B. Herbs; fruits capsular, pedicels 0–4 mm long; seeds ridged or ribbed (Subgen. III. Phyllanthus)

C. Capsules subsessile; seeds transversely ridged

D. Capsules tuberculate

E. Seeds with 10–16 ridges; ridges obscure on the lateral faces and distinct on the dorsal face .. 6. *P. lepidocarpus* Siebold & Zucc.

E. Seeds with 7–9 ridges; ridges distinct on the lateral faces and the dorsal face ......7. *P. embergeri* Haic. & Rossign.

D. Capsules smooth ......8. *P. urinaria* L. subsp. *nudicarpus* Rossign. & Haic.

C. Capsules pedicellate; seeds longitudinally ribbed

E. Sepals 5, acute at apex ....9. *P. amarus* Schum.

E. Sepals 6, obtuse or rounded at apex ....10. *P. debilis* Klein ex Willd.

A. Branching not phyllanthoid (i. e. branchlets subtended by normal leaves on main axes) (Subgen. IV. Isocladus)

B. Stamens 2; sepals of male flowers 4 or 5; pedicels of capsule 1–3.5 mm ....11. *P. ussuriensis* Rupr. & Maxim.

B. Stamens 3; sepals of male flowers 6; pedicels of capsule 4.5–6 mm ....12. *P. simplex* Rets.

Subgen. I. **Kirganelia** (Juss.) G. L. Webster in J. Arnold Arbor. 37: 344 (1956).

1. **Phyllanthus flexuosus** (Siebold & Zucc.) Müll. Arg.

Phyllanthus flexuosus (Siebold & Zucc.) Müll. Arg. in DC., Prodr. 15(2): 324 (1866); Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 12 (1904); Matsumura, Index Pl. Jap. 2(2): 308 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925); Makino & Nemoto, Fl. Jap. rev. ed.: 660 (1931); Nemoto, Fl. Jap. suppl.: 430 (1936); Ohwi, Fl. Jap.: 717 (1953); Hurusawa in J. Fac. Sci. Univ. Tokyo sect. 3, Bot. 6: 329 (1954); Maekawa *et al.*, Makino's New Ill. Fl. Jap.: 344 (1961); Ohwi, Fl. Jap., rev. ed.: 834 (1965); Kitamura & Murata, Col. Ill. Woody Pl. Jap. 1: 332 (1971); Ohwi & Kitagawa, New Fl. Jap.: 942 (1983); Ohwi, Fl. Jap. ed. Engl.: 589 (1984); Ohba in Satake *et al.*, Wild Fl. Jap. Woody Pl. 1: 261 (1989); Kurosawa in Fl. Jap. 2c: 5 (1999). — *Cicca flexuosa* Siebold & Zucc. in Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 143 (1845). — *Glochidion flexuosum* (Siebold & Zucc.) Müll. Arg. ex Miq., Ann. Mus. Bot. Lugd.-Bat. 3: 128 (1867); Franchet & Savatier, Enum. Pl. Jap. 1: 426 (1875). — *Hemicicca flexuosa* (Siebold & Zucc.) Hurus. in Bot. Mag. (Tokyo) 60: 71 (1947); Hara, Enum. Sperm. Jap. 3: 47 (1954).

Hemicicca japonica Baill., Étude Euphorb.: 646 (1858). — *Phyllanthus japonicus* (Baill.) Müll. Arg. in Linnaea 32: 52 (1863). — Type: (herb. Leyd., n. v.).

Japanese name. Koban-no-ki (Matsumura, 1884).

See Kurosawa (1999) for the description of the species.

Distribution. Endemic to Japan: Honshu (Gifu Prefecture and westward), Shikoku and Kyushu (Fig. 1).

Ecology & Habitat. Common in understory of secondary forest and *Cryptomeria japonica* plantation, in thicket, and on forest margin, often found on slope or along path; at altitudes up to 1300 m. Flowering simultaneous, late April to May, simultaneous with leaf emergence; fruiting July to August.

Notes. In spite of the reports by many authors (Makino & Nemoto 1925; Hara 1954; Masamune 1955; Ohwi & Kitagawa 1983; Ohba 1989), *Phyllanthus flexuosus* has never occurred in the Ryukyus. This species has also been reported from China (Forbes & Hemsley 1894;

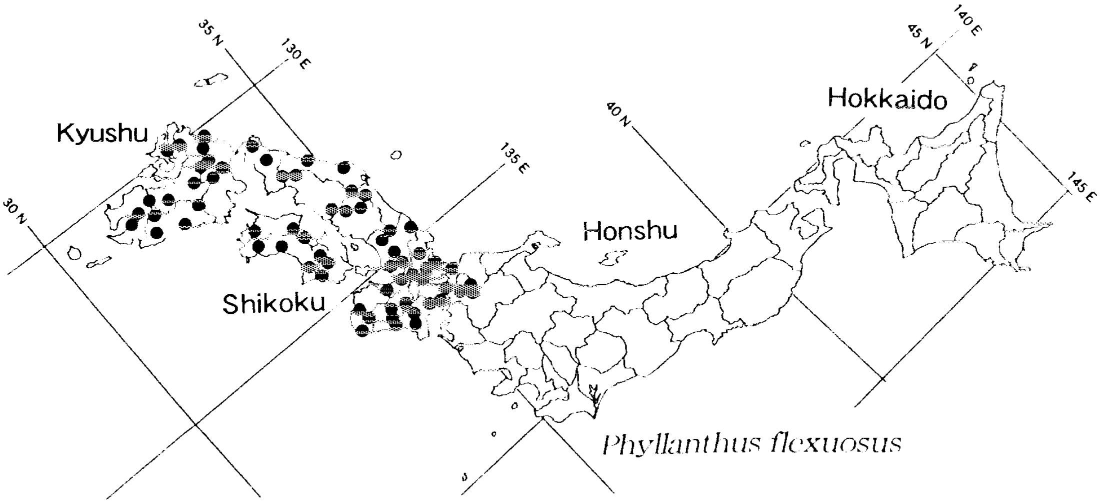

FIG. 1. Distribution of *Phyllanthus flexuosus*.

Rehder & Wilson 1927; Croizat 1940; Ohwi 1984; Li 1994). Chinese plants, however, differ from Japanese ones in their five stamens, five male sepals, six female sepals, and bifid styles according to the description and illustration by Li (1994). They should be recognized as a distinct species each.

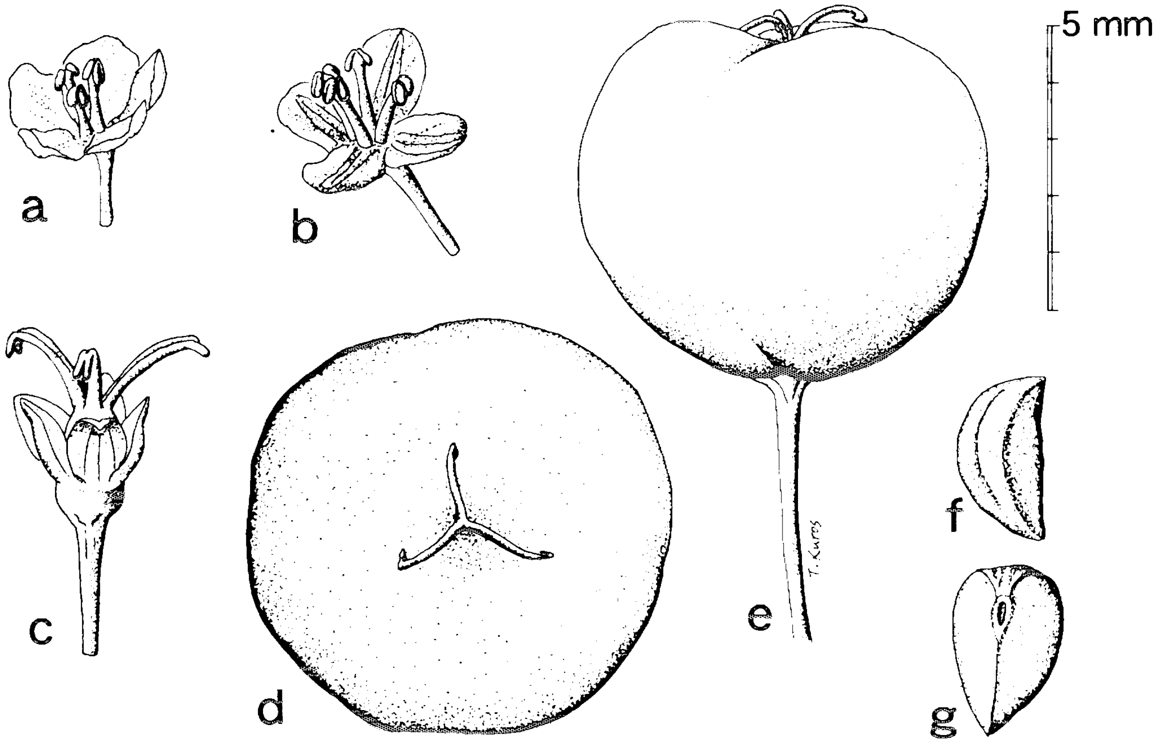

FIG. 2. *Phyllanthus oligospermus* Hayata subsp. *donanensis* T. Kuros, subsp. nov. a & b: male flowers. c: female flower. d & e: mature fruits. f & g: seeds. Drawn from *T. Kurosawa 20036* (a–c) and *T. Kurosawa 20038* (d–g).

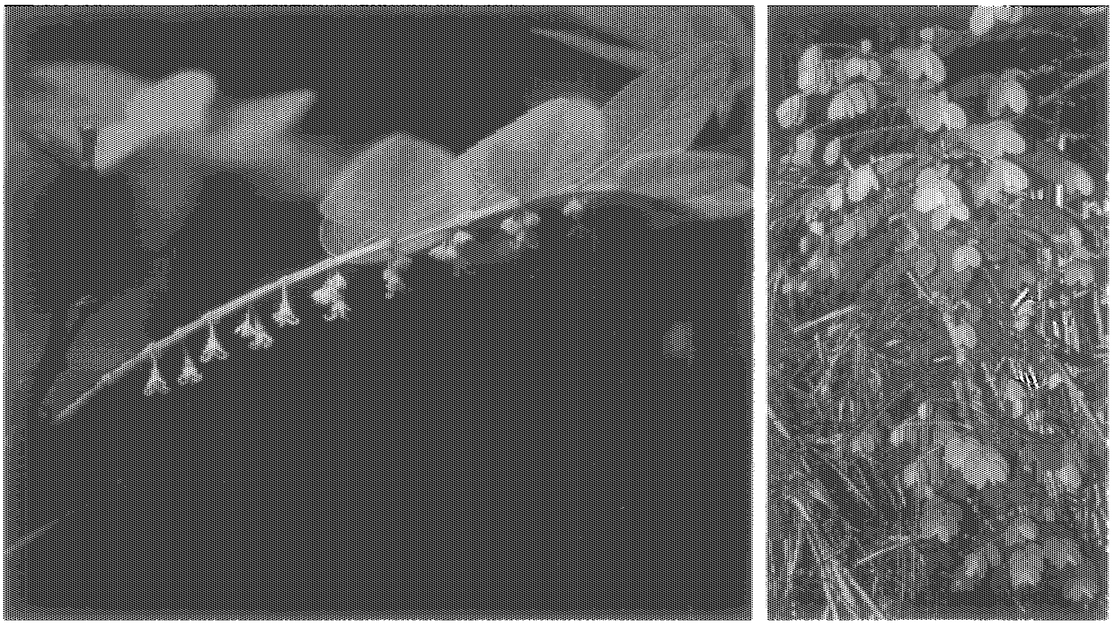

FIG. 3. Flowering individual of *Phyllanthus oligospermus* subsp. *donanensis* at Yonaguni Island, Okinawa Prefecture on Nov. 27, 1999. Left: flowering branch. Right: habit.

2. **Phyllanthus oligospermus** Hayata, Icon. Pl. Formosan. 9: 93 (1920).

subsp. **donanensis** T. Kuros., **subsp. nov.** — Figs. 2 & 3

Affinis Phyllantho oligospermo, sed sepalis feminis 4-5 et staminibus 3-4 diversis.

Typus. T. Kurosawa 20036 (holo TI; iso FKSE, TUS, URO), Japan, Okinawa Pref., Yonaguni Isl., northern foot of Mt. Kubura, alt. 50–100 m. On margin of evergreen forest.

Japanese name. Donan-koban-no-ki (nov.).

Monoecious shrub, 1.5–2 m tall. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Deciduous branchlets 7.5–21 cm, glabrous. Leaves deciduous, alternate, 10–18 per branchlets, glabrous; blades elliptic, 2–5.1 cm long, 1.3–2.7 cm wide, apex rounded or obtuse, base obtuse or cuneate, entire, upper surface green, lower surface whitish, midrib raised beneath; petioles 1.5–2 mm long; stipules persistent or deciduous, free, lanceolate or narrowly oblong, 1.5–2.5 mm long, 0.2–1 mm wide, serrulate, green. Cymules axillary. Flowers September to January. Male flowers 5–7 per cymule; sepals 4–5, equal, elliptic, 1.8–2 mm long, 1–1.2 mm wide, entire, yellowish green; stamens (2–)3–4; filaments free, ca. 1 mm long; anthers dehiscing vertically; pedicels 2–2.5 mm long. Female flowers 1–3 per cymule; sepals deciduous, 4–5, often unequal, elliptic, 1.4–2 mm long, 1–1.2 mm wide, entire; ovary 3-carpeled, spheroidal, ca. 1.4 mm long, ca. 1.5 mm across; styles entire or bifid, free, 2–3 mm long; pedicels 2–4 mm long, gradually thickened distally. Fruits baccate, spheroidal, 7–8 mm across, dark red, pedicels 4–10 mm long, gradually thickened distally. Seeds 6 per fruit, trigonous, ca. 3 mm long, ca. 1.5 mm distally, ca. 2 mm tangentially, brown.

Distribution. Endemic to Japan: Ryukyu (Yonaguni Island) (Fig. 4).

Ecology & Habitat. Very rare; on margin of evergreen forest; at altitudes 50–100 m. Flowering simultaneous and intermittent, throughout the year, simultaneous with leaf emergence; fruiting throughout the year.

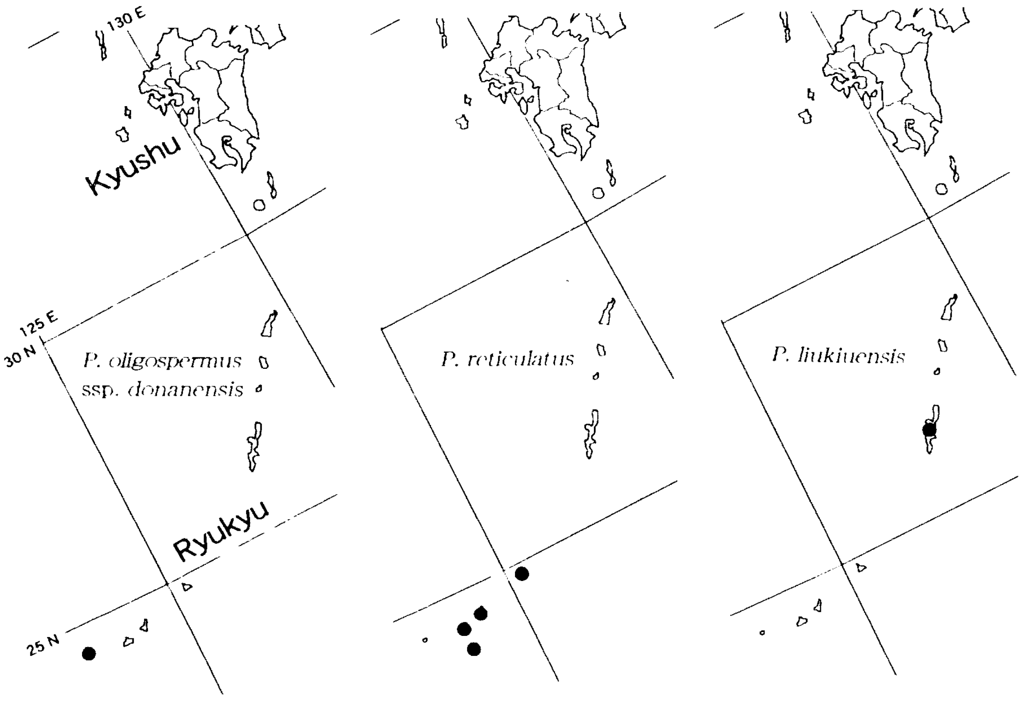

FIG. 4. Distribution of *Phyllanthus oligospermus* subsp. *donanensis*, *P. reticulatus*, and *P. liukiuensis* in Japan.

Notes. The name *donanensis* stems from a local name of the Yonaguni Island, 'Donan'.

Phyllanthus oligospermus subsp. *donanensis* is easily distinguished from *P. flexuosus* by its larger number of stamens and yellowish male sepals. This subspecies resembles subsp. *oligospermus* of Taiwan in most of the reproductive characters, such as fruits size, length of fruit pedicel, color of male and female sepals. However, the former differs from the latter in its smaller number of stamens and female sepals. Seed number per fruit may also differ, although I could not confirm because of lack of ample specimens of subsp. *oligospermus*. Distinctions among *Phyllanthus oligospermus* subsp. *donanensis* and its allied species are shown in Table 1.

Phyllanthus oligospermus subsp. *donanensis* is considered to be a critically endangered plant because it is restricted to Yonaguni Island and I could find only seven mature individuals during my field survey in November 1999. It is needed to estimate population size of subsp. *donanensis* based on thorough investigation.

Other specimens examined. **Okinawa**: Isl. Yonaguni-jima (*M. Furuse 2107, 2108*, RYU; *Tamaki & Niiro s. n.*, Mar. 27–28, 1971, RYU); Yonaguni Isl., northern foot of Mt. Kubura (*T. Kurosawa 20038*, FKSE); Yonaguni Isl., NW slope of Mt. Kubura-dake, alt. ca. 50 m (*T. Yamashiro & Ujiie 4190*, URO); Isl. Yonaguni, near Sonai (*Hatusima et al. 35804A*, RYU).

3. **Phyllanthus reticulatus** Poir.

Phyllanthus reticulatus Poir. in Lam., Encycl. 5: 298. (1804); Müll. Arg. in Linnaea 32: 12 (1863); Müll. Arg. in DC. Prodr. 15(2): 344 (1866); Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 13 (1904); Masamune in Sci. Rep. Kanazawa Univ. 3: 150 (1955); Webster in J. Arnold Arbor. 38: 57 (1957); Hatusima & Amano, Fl. Okinawa, rev. ed.: 64 (1967); Hatusima, Fl. Ryukyus: 370 (1971); Walker, Fl. Okinawa: 627 (1976); Ohba in Satake *et al.*, Wild Fl. Jap. Woody Pl. 1: 262 (1989); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 255 (1990); Kurosawa in Fl. Jap. 2c: 5 (1999). — *Kirganelia reticulata* (Poir.) Baill., Étude Euphorb.: 613 (1858). —*Cicca reticulata* (Poir.) Kurz, Forest Fl. Burma 2: 354 (1877). —Type: (holo in P, herb. Lamarck (fide Webster 1957), n. v.).

Phyllanthus multiflorus Willd., Sp. Pl. 4(1): 581 (1805). —*Kirganelia multiflora* (Willd.) Baill., Étude Euphorb.: 614 (1858). — Type: *D. Klein* (n. v.), India orientali.

Cicca microcarpa Benth., Fl. Hongk.: 312 (1861). —*Phyllanthus microcarpus*

TABLE 1. Distinctions among *Phyllanthus oligospermus* Hayata, *P. oligospermus* subsp. *donanensis*, subsp. nov., *P. glaucus* Wall. ex Müll. Arg., and *P. flexuosus* Siebold & Zucc.

	P. oligospermus ssp. *oligospermus*	*P. oligospermus* ssp. *donanensis*	*P. glaucus*	*P. flexuosus*
Male sepal number	4–6	4–5	***6	4
Male sepal color	yellowish green	yellowish green	?	dark red
Stamen number	3–5	(2–)3–4	***5	2(–3)
Female sepal number	5–6	4–5	***6	4–5
Fruit across	8 mm	7–8 mm	***10 mm	5–6 mm
Seeds per fruit	* **4–5, ***4	6	***6	6
Distribution	Taiwan	Ryukyu (Yonaguni Isl.)	***S. China–Himalaya	W. Japan

* from Hayata (1920). ** from Deng & Wang (1993). *** from Li (1994).

(Benth.) Müll. Arg. in Linnaea 32: 51 (1863); Müll. Arg. in DC. Prodr. 15(2): 343 (1866). —Type: *Seemann* (n. v.), Hongkong; *Wilford* (n. v.), in a ravine on the south side of the island.

Phyllanthus takaoensis Hayata, Icon. Pl. Formosan. 9: 94 (1920). —Lectotype designated by Kurosawa and Shimizu (2000): *B. Hayata s. n.* (TI!), Ape's Hill, Formosa.

[*Kirganelia sinensis* Baill., Étude Euphorb.: 614 (1858), nom. nud. —*Phyllanthus sinensis* (Baill.) Müll. Arg. in Linnaea 32: 12 (1863). —Type: *Gandich., Bonite 95 & 207* (n. v.); *Callery 151 & 152* (n. v.); *Furet. 119* (n. v.)]

Japanese name. Shima-koban-no-ki (Hayata 1904), Taiwan-koban-no-ki (Makino & Nemoto 1925).

See Kurosawa (1999) for the description of the species.

Distribution. Widespread in tropical regions of the Old World (West Africa to India, Ceylon, China, Taiwan, Indonesia, the Philippines and Queensland). Introduced into the West Indies (Webster 1957). In Japan, restricted to Sakishima Islands, Ryukyu (Fig. 4).

Ecology & Habitat. On roadside or forest margin. Flowering successive, throughout the year; fruiting throughout the year.

Notes. *Phyllanthus reticulatus* is sometimes planted around crop field as a windbreak in Ryukyu. Hatusima and Amano (1967), Hatusima (1971), and Shimabuku (1990) treated the species as cultivated or introduced. I cannot say for certain whether the Japanese plants are native or not because of lack of definite informations.

4. **Phyllanthus tenellus** Roxb.

Phyllanthus tenellus Roxb., Fl. Ind. (ed. 1832) 3: 668 (1832); Müll. Arg. in Linnaea 32: 7 (1863); Müll. Arg. in DC. Prodr. 15(2): 338 (1866); Webster in J. Arnold Arbor. 38: 52 (1957); Chen & Wu in Taiwania 42: 254 (1997); Kurosawa in Fl. Jap. 2c: 5 (1999). —Type: *Wallich 7892A* (holo in K (fide Webster 1957), n. v.), Botanic Gardens, Calcutta.

Phyllanthus corcovadensis Müll. Arg. in Martius, Fl. Bras. 11 (2): 30 (1873); Morita & Murata in Acta Phytotax. Geobot. 50: 246 (1999).

Japanese name. Nagae-ko-mikan-sô (Katsuyama 2000), Burajiru-ko-mikan-sô (Morita & Murata 1999).

Annual monoecious herbs. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Stem erect, glabrous, 8–76.5 cm long. Branchlets 3.5–22.5 cm long, glabrous. Cataphylls narrowly triangular, 0.5–1 mm long, 0.1–0.5 mm wide, acuminate at apex, entire, glabrous. Normal leaves alternate, 9–35 per branchlets; leaf blades elliptic, 0.8–2.4 cm long, 0.5–1.3 cm wide, obtuse or rounded at apex, acute, obtuse or rounded at base, entire; petioles 0.6–1 mm long, glabrous; stipules free, narrowly triangular, 0.6–1 mm long, 0.1–0.4 mm wide, acuminate at apex, entire. Cymules axillary. Male flowers 1–6 per cymule; sepals 5, transversely elliptic, 0.5–0.8 mm long, 0.7–0.8 mm wide, entire, glabrous; stamens 4 or 5; filaments connate into a column; pedicels 1–1.2 mm long, glabrous. Female flowers 0–2 per cymule; sepals 5 or 6, narrowly ovate or narrowly elliptic, ca. 0.7 mm long, 0.4–0.5 mm wide, acute or obtuse at apex, glabrous, entire; ovary 3-carpeled, glabrous, entire or verrucose; styles 3, ca. 0.3 mm long, bifid; disk annular. Capsules depressed-globose, ca. 2 mm across, ca. 1.3 mm long, entire; pedicels 4–6 mm long; columella persistent after dehiscence, ca. 0.8 mm long. Seeds sharply trigonous, ca. 1 mm long, ca. 0.8 mm radially, 0.7–0.8 mm tangentially, with minute tubercles.

Distribution. A native of the Mascarene Islands (Webster 1957), now a common weed in tropical and subtropical regions of the world. This species was recently introduced to Honshu (Kanto District and southward), Kyushu, and Ryukyu (Kurosawa 1999, 2001; Morita & Murata 1999). It is also found in the Ogasawara Islands (Hahajima Isl.: *T. Nagashima s. n.*, Nov. 26, 2000, FKSE; Chichijima Isl.: *F. Nobushima 200010117*, FKSE). The first known collection was made at Kamakura and Yamato, Kanagawa Prefecture in 1987 (Kurosawa 2001). See Kurosawa (2001) for a distribution map of the species.

Ecology & Habitat. On roadside and in flower bed; at altitudes up to 110 m. Relatively common in Ryukyu (Kurosawa 2001). It is also an aggressive weed in greenhouses (Webster 1957; Kurosawa 2001). Flowering successive, throughout the year; fruiting throughout the year.

Note. *Phyllanthus tenellus* was often misapplied to *P. amarus* in recent local flora (Kurosawa 1999, 2001).

Subgen. II. **Eriococcus** (Hassk.) Croizat & F. P. Metcalf in J. Arnold Arbor. 23: 32 (1942).

5. **Phyllanthus liukiuensis** Matsum. ex Hayata

Phyllanthus liukiuensis Matsum. ex Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 11 (1904); Matsumura, Index Pl. Jap. 2(2): 308 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925); Makino & Nemoto, Fl. Jap. rev. ed.: 660 (1931); Nemoto, Fl. Jap. suppl.: 430 (1936); Masamune in Sci. Rep. Kanazawa Univ. 3: 149 (1955); Hatusima & Amano, Fl. Okinawa: 59 (1958); Hatusima & Amano, Fl. Okinawa, rev. ed.: 64 (1967); Kurosawa in Fl. Jap. 2c: 5 (1999). —Type: *J. Matsumura s. n.* (holo in TI!), Onnah, Liukiu.

Phyllanthus leptoclados sensu Hatusima, Fl. Ryukyus: 370 (1971), non Benth., Fl. Hongk.: 312 (1861); Walker, Fl. Okinawa: 627 (1976); Ohba in Satake *et al.*, Wild Fl. Jap. Woody Pl. 1: 262 (1989); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 255 (1990).

Japanese name. Hana-ko-mikan-boku (Hayata, 1904).

See Kurosawa (1999) for the description of the species.

Distribution. Endemic to Japan: Ryukyu (Manzamo in Okinawa Island) (Fig. 4).

Ecology & Habitat. Among calcareous rocks at or near seashore; at altitudes up to 5 m. Flowering successive, throughout the year; fruiting throughout the year.

Notes. Hatusima (1971) treated *Phyllanthus liukiuensis* as a synonym of *P. leptoclados*, known from Hongkong, China, and many authors (e.g. Walker 1976; Ohba 1989) have followed his treatment. *Phyllanthus liukiuensis*, however, differs from *P. leptoclados* in its shorter peduncles (Kurosawa 1999) and its smooth seed surface mentioned already by Hayata (1904). *Phyllanthus liukiuensis* occurs in only one existing population of about a thousand of individuals at Manzamo in Okinawa Island, and is listed as vulnerable in "Red Data Book 2nd ed." (Environment Agency of Japan 2000). The area has been conserved as a natural monument by the Government of Okinawa Prefecture.

Subgen. III. **Phyllanthus**

6. **Phyllanthus lepidocarpus** Siebold & Zucc.

Phyllanthus lepidocarpus Siebold & Zucc. in Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 143 (1845).

Phyllanthus hookeri Müll. Arg. in Linnaea 32: 19 (1863); Müll. Arg. in DC. Prodr. 15(2): 366 (1866); Rossignol *et al.* in Amer. J.

Bot. 74: 1862 (1987); Chen & Wu in Taiwania 42: 254 (1997); Kurosawa in Fl. Jap. 2c: 6 (1999). —Type: *Hooker fil. & Thoms. Phyll. 7* (herb. DC. (fide Müller Argoviensis 1866), n. v.), in montibus Khasiae Indiae orientalis.

Phyllanthus niruri sensu Thunberg, Fl. Jap.: 56 (1784), non L., Sp. Pl.: 981 (1753); Siebold & Zucc. in Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 4(2): 144 (1843); Müll. Arg. in DC. Prodr. 15(2): 406 (1866), p. p.; Miquel in Ann. Mus. Bot. Lugd.-Bat. 3: 127 (1867); Franchet & Savatier, Enum. Pl. Jap. 1: 426 (1875); Maekawa *et al.*, Makino's New Ill. Fl. Jap.: 344 (1961).

Phyllanthus urinaria auct. non L., Sp. Pl.: 982 (1753); Müll. Arg. in DC. Prodr. 15(2): 364 (1866), p. p.; Miquel in Ann. Mus. Bot. Lugd.-Bat. 3: 127 (1867); Franchet & Savatier, Enum. Pl. Jap. 1: 426 (1875); Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 8 (1904); Matsumura, Index Pl. Jap. 2(2): 309 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925); Makino & Nemoto, Fl. Jap. rev. ed.: 661 (1931); Nemoto, Fl. Jap. suppl.: 430 (1936); Makino, Ill. Fl. Nippon: 381 (1943); Ohwi, Fl. Jap.: 716 (1953); Hurusawa in J. Fac. Sci. Univ. Tokyo sect. 3, Bot. 6: 329 (1954); Hara, Enum. Sperm. Jap. 3: 51 (1954); Masamune in Sci. Rep. Kanazawa Univ. 3: 150 (1955); Webster in J. Arnold Arbor. 38: 194 (1957), p. p.; Hatusima & Amano, Fl. Okinawa: 59 (1958); Maekawa *et al.*, Makino's New Ill. Fl. Jap.: 343 (1961); Kitamura & Murata, Col. Ill. Herb. Pl. Jap. 2: 76 (1961); Ohwi, Fl. Jap., rev. ed.: 834 (1965); Sugimoto, Keys Herb. Pl. Jap. I, Dicot.: 313 (1965); Hatusima & Amano, Fl. Okinawa, rev. ed.: 64 (1967); Hatusima, Fl. Ryukyus: 369 (1971); Walker, Fl. Okinawa: 628 (1976); Hurusawa in Satake *et al.*, Wild Fl. Jap. Herb. Pl. 2: 230 (1982); Ohwi & Kitagawa, New Fl. Jap.: 941 (1983); Ohwi, Fl. Jap. ed. Engl.: 589 (1984); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 255 (1990).

Japanese name. Ko-mikan-sô (Matsumura 1884), Kitsune-no-chabukuro (Matsumura 1884).

See Kurosawa (1999) for the description of the species.

Distribution. South and southeast Asia, China, Taiwan (Rossignol *et al.* 1987, Chen & Wu 1997). In Japan, Honshu (Fukushima Prefecture and southward), Izu Islands, Ogasawara Islands, Shikoku, Kyushu and Ryukyu (Fig. 5). Although Hurusawa (1982) regarded it as introduced to Japan in modern age, *Phyllanthus lepidocarpus* was probably introduced much earlier or be native to Japan, judging from its rich specimens collected in the 19th century from wide range in Japan.

Ecology & Habitat. Common on roadside, flower bed and cultivated field; at altitudes up to 300 m. This species is a characteristic species of a weedy association, "*Phyllantho urinariae-Lindernietum crustaceae*" (Miyawaki *et al.* 1994). Flowering successive, August to November in Honshu to Kyushu, throughout the year in Ryukyu; fruiting the same as flowering.

Notes. Rossignol *et al.* (1987) indicated that three species had been confused with *Phyllanthus urinaria*. They identify the Japanese plants as *P. hookeri* Müll. Arg. However, the name, *P. lepidocarpus* Siebold & Zucc. (1845), is prior to *P. hookeri* Müll. Arg. (1863).

7. **Phyllanthus embergeri** Haic. & Rossign.

Phyllanthus embergeri Haic. & Rossign. in Amer. J. Bot. 74: 1860 (1987); Chen & Wu in Taiwania 42: 252 (1997). —Type: *Nozeran P.3* (holo in VII, n. v.; iso in VII & P, n. v.), along bay, North Vietnam.

Japanese name. Minami-ko-mikan-sô

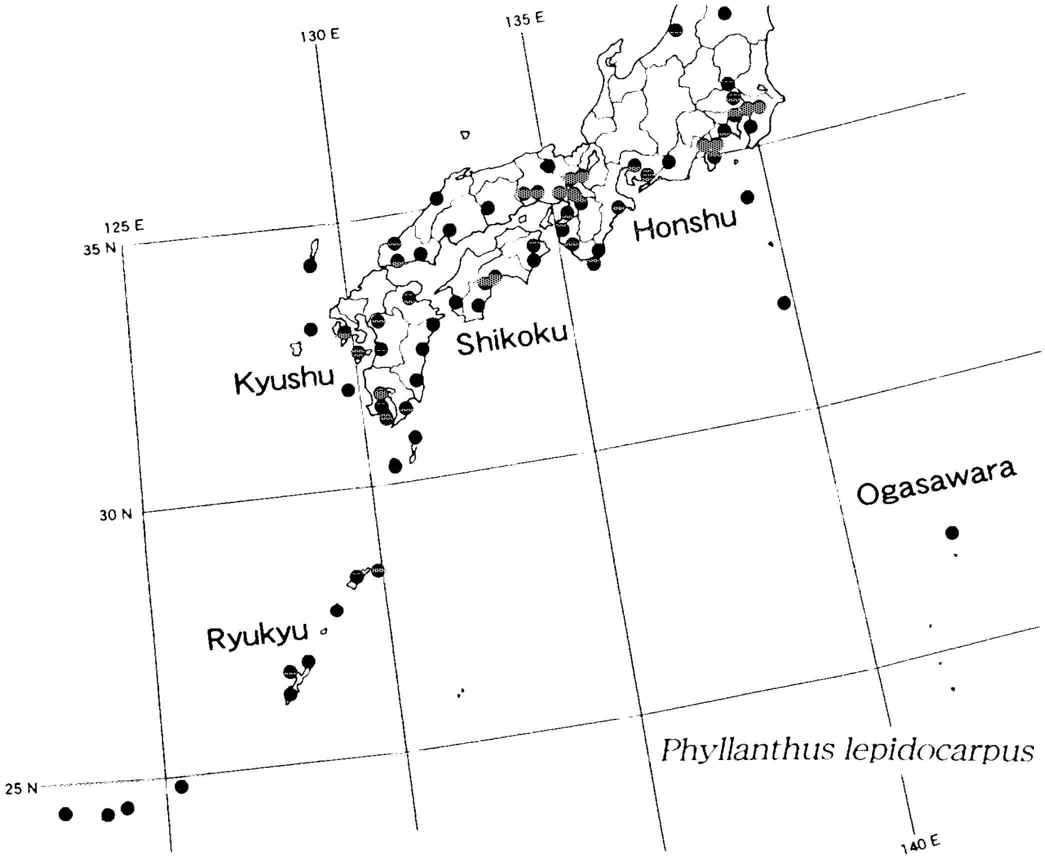

FIG. 5. Distribution of *Phyllanthus lepidocarpus* in Japan.

(nov.).

Annual monoecious herbs. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Stem erect, ascending or procumbent, branched out main axes throughout, glabrous, 7–65 cm long, with ridges. Branchlets 3.5–9 cm long, hispidulous or glabrous. Normal leaves alternate, 20–43 per branchlets; leaf blades oblong or elliptic, 0.5–1.6 cm long, 0.2–0.5 cm wide, mucronate, obtuse or acute at apex, obliquely obtuse at base, margin hispidulous, midrib raised beneath; petioles 0.2–0.5 mm long; stipules lanceolate, 0.7–1.5 mm long, 0.2–0.5 mm wide, acuminate at apex. Cymules axillary. Male flowers 0–2 per cymule; sepals 6, elliptic, 0.3–0.6 mm long, rounded at apex, obscurely toothed, glabrous; stamens 3; filaments connate into a column; pedicels 0.1–0.2 mm long; anthers dehiscing longitudinally. Female flowers 0–1 per cymule; sepals 6, lanceolate or narrowly ovate, ca. 0.8 mm long, obtuse at apex, glabrous, obscurely toothed or almost entire; ovary 3-carpeled, glabrous, verrucose; styles 3, ca. 0.1 mm long, bifid. Capsules depressed-globose, ca. 2.5 mm across, ca. 1.5 mm long, verrucose; pedicels ca. 0.2 mm long; columella persistent after dehiscence, ca. 0.8 mm long. Seeds sharply trigonous, 1.2- 1.4 mm long, ca. 1 mm radially, 1–1.2 mm tangentially, with 7–9 transverse ridges, ridges distinct on the lateral faces and the dorsal face, yellowish brown, somewhat glossy.

Distribution. India to Indochina, S. China, and Taiwan (Rossignol *et al.* 1987; Chen & Wu 1997). In Japan, restricted to Sakishima Islands in Ryukyu (Fig. 6).

Ecology & Habitat. On roadside and cultivated field. Flowering successive, August to

November ?; fruiting August to November ?

Notes. This is the first record of *Phyllanthus embergeri* from Japan. The species and *P. lepidocarpus* share the subsessile, tuberculate fruits and transversely ridged seeds. However, they differ from each other in seed surface as shown by Rossignol *et al.* (1987) and Chen & Wu (1997).

8. **Phyllanthus urinaria** L. subsp. **nudicarpus** Rossign. & Haic.

Phyllanthus urinaria L. subsp. *nudicarpus* Rossign. & Haic. in Amer. J. Bot. 74: 1861 (1987); Chen & Wu in Taiwania 42: 257 (1997). — Type: *Nozeran P.6* (holo in VII, n. v.; iso in VII & P, n. v.), Tam Dao, North Vietnam.

Japanese name. Terimi-ko-mikan-sô (nov.).

Annual monoecious herbs. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Stem erect, ascending or procumbent, scarcely branched out main axes, glabrous, 25–36 cm long, with ridges. Branchlets 6–7.5 cm long, glabrous or hispidulous. Normal leaves alternate, 25–36 per branchlets; leaf blades oblong or elliptic, 0.7–1.3 cm long, 0.3–0.5 cm wide, mucronate at apex, obliquely truncate at base, margin entire or hispidulous, midrib raised beneath; petioles 0.2–0.3 mm long; stipules lanceolate, 1–1.4 mm long, 0.3–0.4 mm wide, acuminate or cuspidate at apex. Cymules axillary. Male flowers 0–2 per cymule; sepals 6, elliptic, ca. 0.5 mm long, rounded at apex, obscurely toothed, glabrous; stamens 3; filaments connate into a column; pedicels ca. 0.2 mm long; anthers dehiscing longitudinally. Female flowers 0–1 per cymule; sepals 6, lanceolate or narrowly ovate, ca. 0.8 mm long, obtuse or acute at apex, glabrous, obscurely toothed or almost entire; ovary 3-carpeled, glabrous, smooth; styles 3, ca. 0.05 mm long, bifid. Capsules depressed-globose, ca. 2.5 mm across, ca. 1.5 mm long, smooth; pedicels ca. 0.2 mm long; columella persistent after dehiscence, ca. 0.8 mm long. Seeds sharply trigonous, ca. 1.2 mm long, ca. 0.9 mm radially, ca. 0.9 mm tangentially, with 7 transverse ridges, ridges obscure on the lateral faces and distinct on the dorsal face, yellowish brown, somewhat glossy.

Distribution. Vietnam to the Philippines, S. China and Taiwan (Rossignol *et al.* 1987; Chen & Wu 1997). In Japan, restricted to Sakishima Islands in Ryukyu (Fig. 6).

Ecology & Habitat. Habitat unknown. Flowering successive, July to December; fruiting July to December.

Notes. This is the first record of *Phyllanthus urinaria* subsp. *nudicarpus* from Japan. It is easily distinguishable from *P. urinaria*, *P. embergeri*, and *P. lepidocarpus* by its smooth capsule (Rossignol *et al.* 1987).

9. **Phyllanthus amarus** Schum.

Phyllanthus amarus Schum., Beskr. Guin. Pl.: 421 (1827); Schumacher & Thonning, Kongel. Danske Vidensk. Selsk. Naturvidensk. Math. Afh. 4: 195 (1829); Webster in J. Arnold Arbor. 38: 313 (1957); Hatusima & Amano, Fl. Okinawa: 59 (1958); Hatusima & Amano, Fl. Okinawa, rev. ed.: 64 (1967); Hatusima, Fl. Ryukyus: 370 (1971); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 255 (1990); Chen & Wu in Taiwania 42: 251 (1997); Kurosawa in Fl. Jap. 2c: 6 (1999). — *Phyllanthus niruri* L. var. *amarus* (Schum.) Leandri, Fl. Madagascar 111: 73 (1958). — [*Phyllanthus niruri* L. subsp. *amarus* Leandri; Hurusawa in Satake *et al.*, Wild Fl. Jap. Herb. Pl. 2: 231 (1982)] — Type: *Schumacher & Thonnig* (holo in C (fide Webster 1957), n. v.), Guinée, Africa.

Phyllanthus niruri sensu Swartz, Obs. Bot.: 354

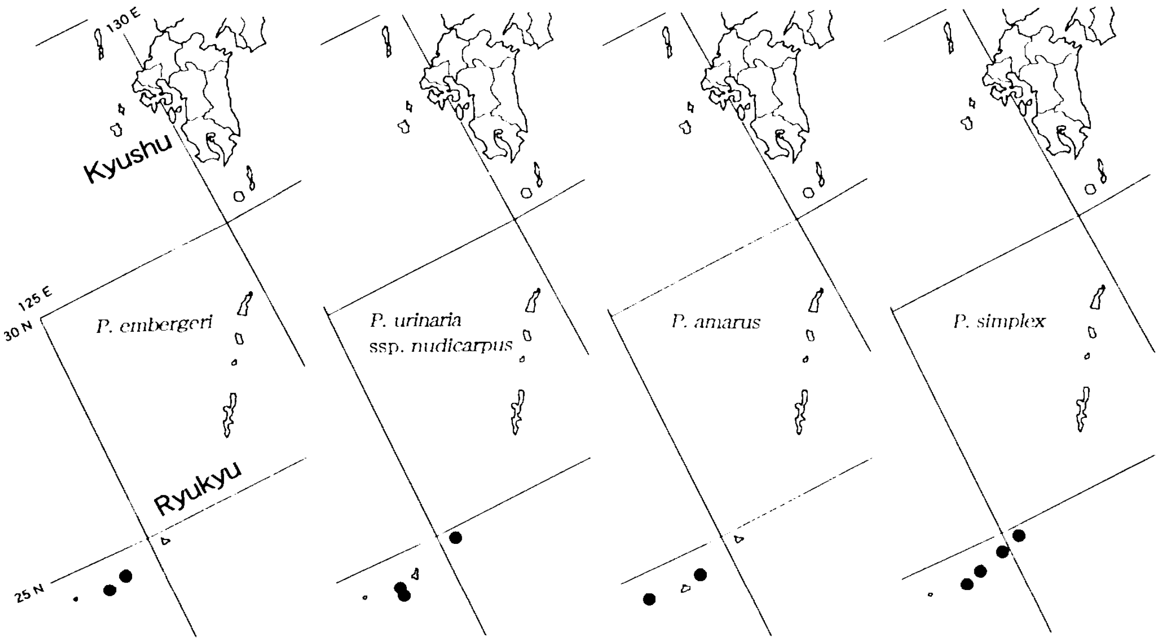

FIG. 6. Distribution of *Phyllanthus embergeri*, *P. urinaria* subsp. *nudicarpus*, *P. amarus*, and *P. simplex* in Japan.

(1791), non L., Sp. Pl.: 981 (1753); Müll. Arg. in Linnaea 32: 43 (1863), p. p.; Müll. Arg. in DC. Prodr. 15(2): 406 (1866), p. p.; Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 7 (1904), p. p.; Matsumura, Index Pl. Jap. 2(2): 308 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925), p. p.; Makino & Nemoto, Fl. Jap. rev. ed.: 660 (1931), p. p.; Nemoto, Fl. Jap. suppl.: 430 (1936), p. p.; Hurusawa in J. Fac. Sci. Univ. Tokyo sect. 3, Bot. 6: 329 (1954); Hara, Enum. Sperm. Jap. 3: 51 (1954), p. p.; Masamune in Sci. Rep. Kanazawa Univ. 3: 150 (1955); Sugimoto, Keys Herb. Pl. Jap. I, Dicot.: 313 (1965).

Japanese name. Kidachi-ko-mikan-sô (Hayata 1904), Kidachi-mikan-sô (Hurusawa 1982).

Annual monoecious herbs. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Stem erect, glabrous, 36–54 cm long. Branchlets 8–13.5 cm long, glabrous. Normal leaves alternate, 28–43 per branchlets; leaf blades elliptic, 0.5–1.3 cm long, 0.2–0.6 cm wide, rounded or obtuse at apex, rounded or truncate at base, glabrous, entire, midrib raised beneath; petioles 0.4–0.5 mm long; stipules lanceolate, 0.8–1 mm long, 0.2–0.4 mm wide, acuminate or cuspidate at apex. Cymules axillary. Male flowers 0–1 per cymule; sepals 5, elliptic, 0.5–0.6 mm long, acute at apex, obscurely toothed or entire, glabrous; stamens 3; filaments connate into a column; pedicels 0.8–1.5 mm long; anthers dehiscing horizontally. Female flowers 0–1 per cymule; sepals 5, elliptic, ca. 0.8 mm long, 0.3–0.4 mm wide, obtuse or acute at apex, glabrous, entire; ovary 3-carpeled, glabrous, smooth; styles 3, 0.1–0.2 mm long, bifid. Capsules depressed-globose, 1.8–2 mm across, 1.3–1.4 mm long, smooth; pedicels 1–1.2 mm long; columella persistent after dehiscence, ca. 0.7 mm long. Seeds sharply trigonous, ca. 1 mm long, 0.7–0.8 mm radially, 0.7–0.8 mm tangentially, with 6 longitudinal ribbs on the dorsal face, with 4–5 semicircular ribbs on the lateral faces, yellowish brown.

Distribution. A native of tropical America, but now a common weed in tropical and subtropical regions of the world (Webster 1957). In Japan, naturalized in Sakishima Islands and Daitojima Islands in Ryukyu (Fig. 6). The earliest record of the species from Japan is the collection made on Ishigaki Island in 1948 (*T. Amano 5861*, TNS!).

Ecology & Habitat. On roadside, flower bed and cultivated field. Flowering successive, August to November ?; fruiting August to November ?

Notes. A historical review on the confusion between *Phyllanthus amarus* and *P. niruri* is given by Webster (1956, 1957). The names of *P. niruri* or *P. amarus* have been misapplied to other herbaceous *Phyllanthus* in Japan. *Phyllanthus niruri* in the sense of Thunberg (1784) appears to be *P. lepidocarpus* because its fruits are sessile, squamulose and echinulate (Siebold & Zuccarini 1845). Hayata's record (1904) of *P. niruri* from Tokyo is referable to *P. ussuriensis* (*Collector unknown s. n.*, Sep. 19, 1880, TI!). *Phyllanthus niruri* described and illustrated by Maekawa *et al.* (1961) and *P. niruri* subsp. *amarus* by Ono *et al.* (1989) refer to *P. lepidocarpus*. Many of the literature records of *P. niruri* or *P. niruri* subsp. *amarus* from Honshu and Kyushu (e.g. Matsumura 1912; Makino & Nemoto 1925; Hara 1954; Hurusawa 1982) appear to follow the misapplication of Hayata (1904) or Maekawa *et al.* (1961). *Phyllanthus niruri* subsp. *amarus* recorded recently in local flora of Honshu is referable to *P. tenellus* (Kurosawa 2001). *Phyllanthus amarus* is obviously distinguished from *P. ussuriensis* by its phyllanthoid branching, and from *P. lepidocarpus* and *P. tenellus* by its 5 sepals, 3 stamens, connate filaments, smooth capsules and longitudinally rugose seeds (Fig. 7).

10. **Phyllanthus debilis** Klein ex Willd.

Phyllanthus debilis Klein ex Willd., Sp. Pl. 4(1): 582 (1805); Webster in J. Arnold Arbor. 38: 307 (1957); Sugimoto, Keys Herb. Pl. Jap. I, Dicot.: 313 (1965); Hatusima, Fl. Ryukyus: 370 (1971); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 255 (1990); Chen & Wu in Taiwania 42: 252 (1997); Kurosawa in Fl. Jap. 2c: 6 (1999). — *Phyllanthus niruri* L. var. *debilis* (Klein ex Willd.) Müll. Arg. in Linnaea 32: 43 (1863); Müll. Arg. in DC. Prodr. 15(2): 407 (1866). — Type: *Klein* (B, herb. Willdenow (fide Webster 1957), n. v.), Tranquebar, Madras, India.

Phyllanthus niruri L. var. *javanicus* Müll. Arg. in Linnaea 32: 43 (1863); Müll. Arg. in DC. Prodr. 15(2): 407 (1866). — Type: *Zolling 33* (herb. lugd. bat. (fide Müller Argoviensis 1866), n. v.) & *Zolling 158* (n. v.), in insula Java.

Phyllanthus boninsimae Nakai in Bot. Mag. (Tokyo) 26: 96 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925); Makino & Nemoto, Fl. Jap. rev. ed.: 659 (1931); Nemoto, Fl. Jap. suppl.: 430 (1936); Hara, Enum. Sperm. Jap. 3: 50 (1954). — Type: *B. Kawate, s. n.* (holo in TI!), Omura, Bonin.

Japanese name. Ogasawara-ko-mikan-sô (Hatusima 1971), Ogasawara-mikan-sô (Makino & Nemoto 1925).

Annual monoecious herbs. Branching phyllanthoid (i. e. branchlets subtended by cataphylls on main axes). Stem erect, glabrous, 6.5–82 cm long. Branchlets 2.5–15.5 cm long, glabrous. Normal leaves alternate, 12–37 per branchlets; leaf blades narrowly elliptic or elliptic, 0.7–1.8 cm long, 0.2–0.8 cm wide, obtuse or rounded at apex, acute at base, glabrous, entire, midrib raised beneath; petioles 0.4–0.7 mm long; stipules lanceolate, 0.8–1.4 mm long, 0.3–0.4 mm wide, acuminate at apex. Cymules axillary. Male flowers 0–2 per cymule;

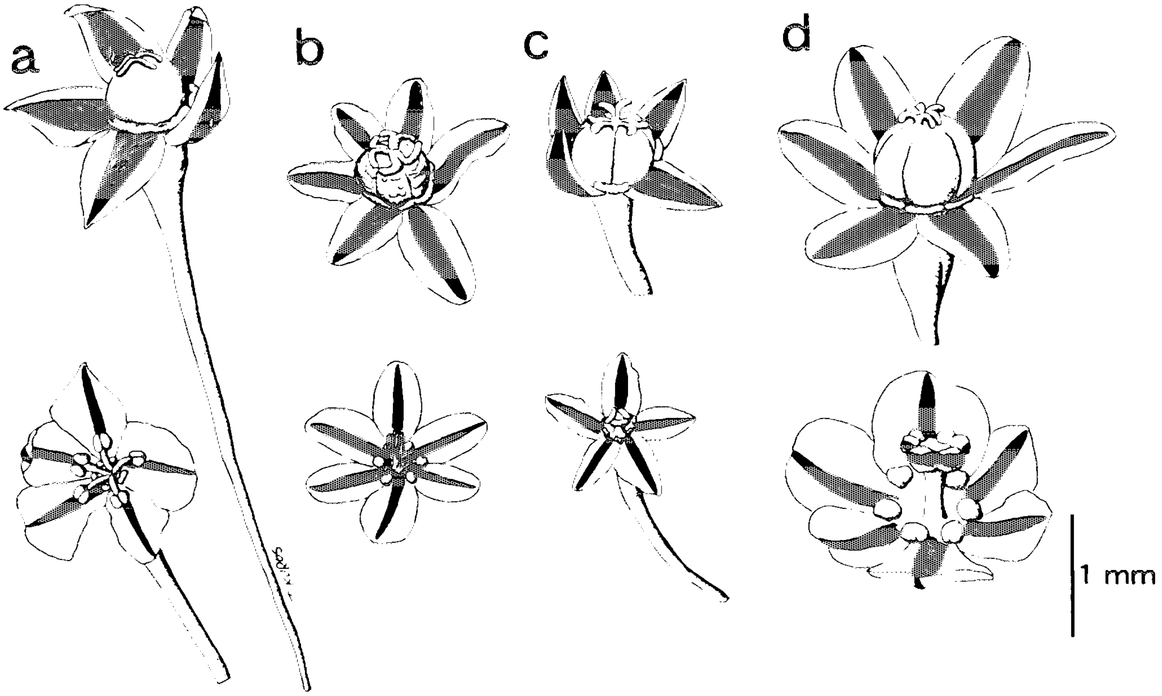

FIG. 7. Female (upper) and male (lower) flowers of herbaceous *Phyllanthus*. a. *P. tenellus* from Isl. Ishigaki, Ryukyu (*T. Kurosawa & S. Matsumura 20027*, FKSE). b. *P. lepidocarpus* from Isl. Amami-ohshima, Ryukyu (*Y. Tateishi & T. Kurosawa 52031*, URO). c. *P. amarus* from Isl. Ishigaki, Ryukyu (*T. Kurosawa & S. Matsumura 20026*, FKSE). d. *P. debilis* from Isl. Iriomote, Ryukyu (no voucher speciemen).

sepals 6, widely elliptic or widely obovate, 0.6–1 mm long, rounded at apex, obscurely toothed or entire, glabrous; stamens 3; filaments connate into a column; pedicels 0.5–0.7 mm long; anthers dehiscing horizontally. Female flowers 0–1 per cymule; sepals 6, elliptic or obovate, ca. 1.2 mm long, ca. 0.8 mm wide, rounded at apex, glabrous, entire; ovary 3-carpeled, glabrous, smooth; styles 3, ca. 0.2 mm long, bifid. Capsules depressed-globose, 2–2.4 mm across, smooth; pedicels 0.8–1.2 mm long; columella persistent after dehiscence, ca. 0.8 mm long. Seeds sharply trigonous, 1–1.2 mm long, ca. 0.9 mm radially, ca. 0.9 mm tangentially, with 7–8 longitudinal ribbs on the dorsal face, with 4–5 semicircular ribbs on the lateral faces, brown.

Distribution. A native of southern India and Ceylon (Webster 1957, 1986), now a common weed in tropical and subtropical regions of the world. In Japan, naturalized in Ogasawara and Ryukyu (Fig. 8). The earliest record of the species from Ogasawara is the collection made on Island Chichi-jima in 1905 (*H. Hattori s. n.*, Jul. 16, 1905, TI!), and Ryukyu on Island Amami-ohshima in 1968 (*H. Ohno s. n.*, Jul. 20, 1968, MAK!).

Ecology & Habitat. Relatively common on roadside, flower bed and cultivated field; at altitudes up to 300 m. Flowering successive, July to December; fruiting July to December.

Subgen. IV. **Isocladus** G. L. Webster in J. Arnold Arbor. 37: 345 (1956).

11. **Phyllanthus ussuriensis** Rupr. & Maxim.

Phyllanthus ussuriensis Rupr. & Maxim. in Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg 15: 222 (1856); Murata in Acta Phytotax. Geobot. 17: 173 (1958); Kitamura & Murata, Col. Ill. Herb. Pl. Jap. 2: 76 (1961); Sugimoto, Keys Herb. Pl. Jap. I, Dicot.: 313 (1965); Ohwi &

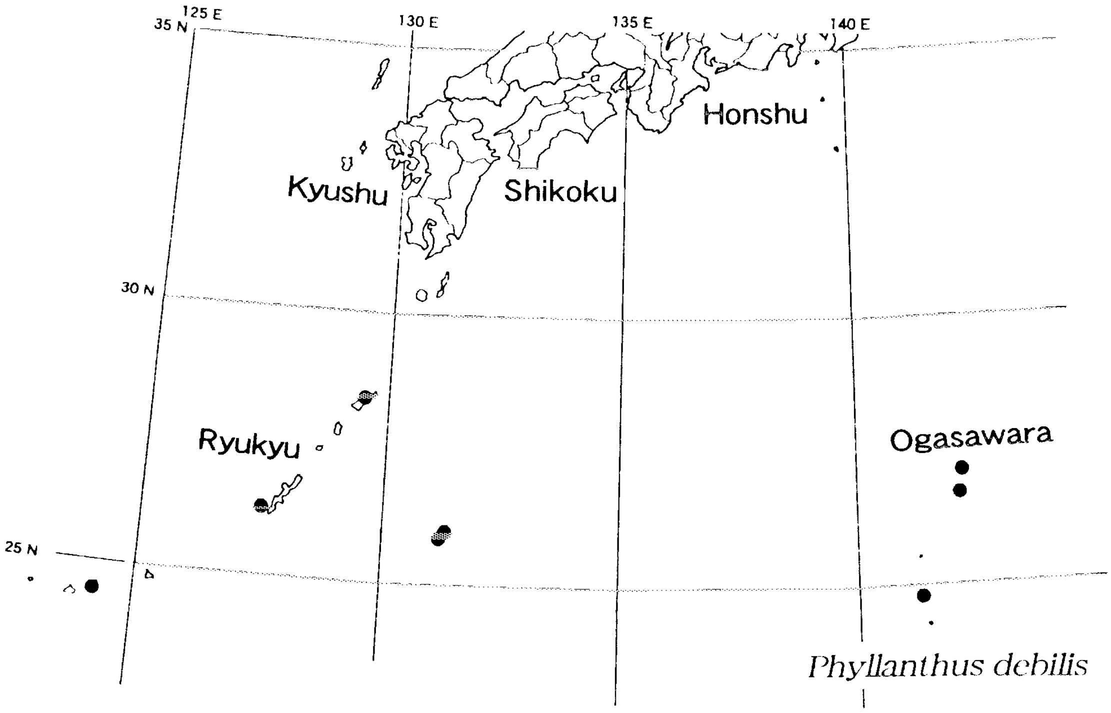

FIG. 8. Distribution of *Phyllanthus debilis* in Japan.

Kitagawa, New Fl. Jap.: 942 (1983); Chen & Wu in Taiwania 42: 257 (1997); Kurosawa in Fl. Jap. 2c: 6 (1999). — *Phyllanthus simplex* Retz. var. *ussuriensis* (Rupr. & Maxim.) Müll. Arg. in Linnaea 32: 33 (1863); Müll. Arg. in DC. Prodr. 15(2): 392 (1866).

Phyllanthus simplex Retz. var. *chinensis* Müll. Arg. in Linnaea 32: 33 (1863); Müll. Arg. in DC. Prodr. 15(2): 391 (1866). — *Phyllanthus virgatus* G. Forst. var. *chinensis* (Müll. Arg.) G. L. Webster in E. Walker, J. Jap. Bot. 46: 68 (1971). — Type: *Park 57* (herb. DC., n. v.), prope Cantonem, in China; *Hance 1223* (herb. Berol., n. v.), prope Hongkong.

Phyllanthus matsumurae Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 11 (1904); Matsumura, Index Pl. Jap. 2(2): 308 (1912); Makino & Nemoto, Fl. Jap.: 653 (1925); Makino & Nemoto, Fl. Jap. rev. ed.: 660 (1931); Nemoto, Fl. Jap. suppl.: 430 (1936); Makino, Ill. Fl. Nippon: 382 (1943); Ohwi, Fl. Jap.: 717 (1953); Hurusawa in J. Fac. Sci. Univ. Tokyo sect. 3, Bot. 6: 329 (1954); Hara, Enum. Sperm. Jap. 3: 50 (1954); Maekawa *et al.*, Makino's New Ill. Fl. Jap.: 344 (1961); Ohwi, Fl. Jap., rev. ed.: 834 (1965); Hurusawa in Satake *et al.*, Wild Fl. Jap. Herb. Pl. 2: 230 (1982); Ohwi, Fl. Jap. ed. Engl.: 589 (1984). — Lectotype designated by Kurosawa & Shimizu (2000): *G. Nikai 775* (TI!), in tractu Yoshiki, Prov. Suwau.

Phyllanthus simplex sensu Miquel in Ann. Mus. Bot. Lugd.-Bat. 3: 127 (1867), non Retz., Observ. Bot. 5: 29 (1788); Franchet & Savatier, Enum. Pl. Jap. 1: 426 (1875).

Phyllanthus niruri sensu Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 7 (1904), p. p., non L., Sp. Pl.: 981 (1753).

Japanese name. Hime-mikan-sô (Makino 1890).

See Kurosawa (1999) for the description of the species.

Distribution. Mongolia, Ussuri, China, Taiwan, and Korea (Murata 1958; Li 1994; Chen & Wu 1997). In Japan, found in Hokkaido (Oshima Peninsula), Honshu, Shikoku and Kyushu; absent in central and northern Hokkaido, Ryukyu, and Ogasawara (Fig. 9).

Ecology & Habitat. Relatively common on roadside, flower bed and cultivated field; at altitudes up to 1200 m. Flowering successive, April to December; fruiting April to December.

Notes. *Phyllanthus ussuriensis* (as *P. matsumurae*) reported by Masamune (1955) from wide range of the Ryukyus appears to be referable to other herbaceous *Phyllanthus* species. *Phyllanthus ussuriensis* (as *P. virgatus* var. *sinensis*) reported by Walker (1976) from Sakishima Islands is considered to be *P. simplex* (*Fosberg 38168 & 37939*, RYU!). Chen & Wu (1997) summarized the differences of *P. ussuriensis* and *P. simplex* (as *P. virgatus*).

12. **Phyllanthus simplex** Retz.

Phyllanthus simplex Retz., Observ. Bot. 5: 29 (1788); Müll. Arg. in Linnaea 32: 32 (1863); Müll. Arg. in DC. Prodr. 15(2): 391 (1866); Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 10 (1904); Murata in Acta Phytotax. Geobot. 17: 174 (1958). — Type: (n. v.), E. Tranquebar.

Phyllanthus matsumurae sensu Hatusima & Amano, Fl. Okinawa: 59 (1958), non Hayata in J. Coll. Sci. Imp. Univ. Tokyo 20(3): 11 (1904).

Phyllanthus virgatus auct. non G. Forst., Fl. Ins. Austr. Prodr.: 65 (1786); Hatusima & Amano, Fl. Okinawa, rev. ed.: 64 (1967); Hatusima, Fl. Ryukyus: 369 (1971); Hurusawa in Satake *et al.*, Wild Fl. Jap. Herb. Pl. 2: 230 (1982); Chen & Wu in Taiwania 42: 259 (1997); Kurosawa in Fl. Jap. 2c: 7 (1999).

Phyllanthus virgatus G. Forst. var. *chinensis* sensu Walker in J. Jap. Bot. 46: 68 (1971), non (Müll. Arg.) G. L. Webster in Walker in J. Jap. Bot. 46: 68 (1971); Hatusima, Fl. Ryukyus rev. ed.: 884 (1975); Walker, Fl. Okinawa: 628 (1976); Shimabuku, Check List Vasc. Fl. Ryukyu Islands: 256 (1990).

Japanese name. Shima-hime-mikan-sô (Hatusima 1971), Shima-ko-mikan-sô (Hayata 1904), Taiwan-hime-mikan-sô (Makino & Nemoto 1925), Taiwan-hime-ko-mikan-sô (Murata 1958).

See Kurosawa (1999) for the description of

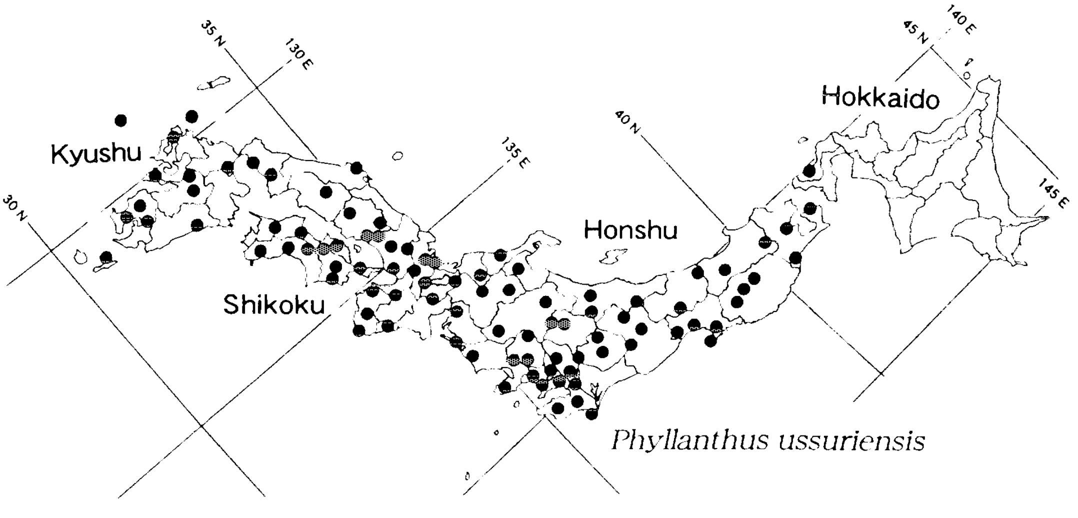

FIG. 9. Distribution of *Phyllanthus ussuriensis* in Japan.

the species (as *P. virgatus*).

Distribution. Tropical and subtropical regions of Asia (Webster 1986; Li 1994; Chen & Wu 1997). In Japan, restricted to Sakishima Islands in Ryukyu (Fig. 6).

Ecology & Habitat. On roadside and cultivated field; at altitudes up to 60 m. Flowering successive, throughout the year; fruiting throughout the year.

Notes. This species differs from a Pacific species, *Phyllanthus virgatus*, in larger seeds, longer fruiting pedicels, strongly papillate ovaries and an undissected pistillate disk (Webster 1986).

Excluded taxa

Phyllanthus trigonocladus Ohwi in Bull. Nat. Sci. Mus. Tokyo n. s. 1: 7 (1954) — Type: *Shun'ichi Sasaki & Shigeru Ouchiyama 3* (holo in TNS!), ins. Mageshima prope ins. Tanegashima = **Flueggea trigonoclada** (Ohwi) T. Kuros., Fl. Jap. 2c: 8 (1999).

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Appendix

Voucher specimens for Figs. 1, 4–6, 8–9. Herbarium acronyms from Holmgren *et al.* (1990). CBM: Herbarium, Natural History Museum and Institute, Chiba. FKSE: Herbarium, Faculty of Education, Fukushima University. KPM: Herbarium, Kanagawa Prefectural Museum. SAPT: Herbarium, Faculty of Agriculture, Hokkaido University. TKPM: Herbarium, Tokushima Prefectural Museum.

1. **Phyllanthus flexuosus** (Siebold & Zucc.) Müll. Arg. (Fig. 1)

Fukui: Onyu-gun, Chimi-mura (*Z. Tashiro s. n.*, Jun. 30, 1934, KYO); Tsuruga-shi, Kurokoyama (*Z. Tashiro s. n.*, Jul. 7, 1927, KYO). **Gifu**: Ibi-gun, Tanigumi-mura, in the vicinity of Kami-Kanbara (*H. Takahashi*

& H. Takano 7422, KYO); Motosu-gun, Neo-mura, Mitori-dani valley (*K. Ueda 15*, KYO); Mugi-gun, Horado-mura, en route from Kohga to the top of Mt. Kohga-san (*H. Takahashi et al. 8152*, KYO). **Mie**: Ichisigun, Misugimura, Hirakura-experimental forest of Mie Univ. (*G. Murata 18523*, KYO); Inabe-gun, Ishigure-mura, Mt. Ryûgadake (*N. Fukuoka 6005*, KYO); Kameyama City, at the summit of Mt. Nonobori (*N. Fukuoka 5129*, KYO); Owase-shi, Kuki-machi, in the valley of Hitodo (*S. Ishizawa 16375*, KYO); Taki-gun, Odani-cho, Osugi-dani (*G. Murata 19755*, KYO). **Shiga**: Inukami-gun, Taga-cho, en route from Kawachi to Mt. Ryozen (*T. Yahara s. n.*, May 17, 1977, KYO); Ohtsu-shi, Mt. Hiei-zan, Yokawachudo - Konponchudo (*H. Ohashi et al. 8845*, TUS). **Kyoto**: Ayabe-shi, Koyaoka-cho, Mt. Tokin-zan (*S. Tsugaru & T. Takahashi 20056*, KYO); Kameoka-shi, Shino-cho, Ikenotani-rindo (*S. Tsugaru & M. Sawada 16566*, TUS); Kitakuwada-gun, Miyama-cho, en route from Sasari-toge to Sasari (*S. Tsugaru & T. Takahashi 20193*, KYO). **Osaka**: Mt. Ganyu (*T. Makino s. n.*, May 2, 1938, KYO); Mishima-gun, inter Minoo et Katsuo-ji (*G. Murata 8757*, KYO). **Hyogo**: Kanzaki-gun, Kanzaki-cho, en route from Iwaya to Okuarata (*N. Fukuoka & N. Kurosaki 2221*, KYO); Kinosaki-gun, Takeno-mura, Takuwi (*Unknown collector s. n.*, Jun. 18, 1932, MAK); Shisô-gun, Antomi-cho, along Hayashida-gawa between Anshi and Seki (*N. Fukuoka 10393*, KYO); Shisô-gun, Haga-cho, SE foot of Mt. Mimuro-yama, Akanishi-dani (*N. Kurosaki 7881*, KYO); Taki-gun, Tannan-cho, Furuichi, Haganoshinden (*N. Kurosaki & H. Imai 192*, TUS). **Nara**: Uda-gun, Muroo-mura, Muroo-ji temple (*N. Naruhashi et al. 25*, KYO); Yoshino-gun, Shimokitayama-mura, near Ikehara-Dam (*G. Murata & T. Takahashi 70567*, TUS); Yoshino-gun, Tenkawa-mura, Shirokura-dani (*R. Nishimura 912*, KYO). **Wakayama**: Higashimuro-gun, Hongu-cho, Kawayu-onsen (*N. Naruhashi 1690*, KYO); Higashi-Muro-gun, Koza-cho, W. of Tahara, Hohjima (*T. Fukuhara* 5076, KYO); Nishimuro-gun, Kamihaya-mura (*N. Ui s. n.*, Jun. 16, 1909, MAK). **Tottori**: Hino-gun, Koufu-cho (*A. Tanaka 21019*, KYO); Hino-gun, Nichinan-cho, Kaibara (*A. Tanaka 20323*, KYO). **Shimane**: Hamada-shi, Sankai-machi, N foot of Mt. Kakinoki-yama (*N. Kurosaki 9125*, KYO); Izumo-city, Ottachi-tyo, Tachikue (*G. Murata 11627*, KYO). **Okayama**: Kawakami-gun, Nariwa-cho, E. slope of Mt. Tenjin-yama (*N. Kurosaki 9294*, TUS); Maniwagun, Katsuyamacho, Kanbanotaki (*G. Murata 27142*, KYO). **Hiroshima**: Fukuyama-shi, Yamano-kyo (*K. Inami s. n.*, May 6, 1978, CBM); Yamagata-gun, Togouchi-cho, Osorake-zan (*Y. Miyagi s. n.*, Jun. 3, 1979, URO). **Yamaguchi**: Abu-gun, Nagato-kyo (*H. Ohba 35*, KYO); Kuga-gun, Nishiki-cho, Souzu-kyo (*K. Oka s. n.*, Aug. 5, 1984, TUS); Toyoura-gun, Toyota-cho, Era (*G. Imada 4451*, TUS). **Tokushima**: Kaifu-gun, Kainan-cho (*S. Takafuji s. n.*, Jul. 21, 1975, KYO); Miyoshi-gun, Higashiiyayama-mura (*Y. Akasawa 0814*, TKPM); Oe-gun, Koyadaira-son (*S. Takafuji 434*, KYO). **Ehime**: Ishizuchi-yama (*T. Makino s. n.*, 1931, MAK); Uma-gun, Besshi-Yamamura between Mt. Higashiakaishi and Mt. Ozare (*G. Murata 15029*, KYO); Uwajima City, Nametoko (*N. Fukuoka 8595*, KYO). **Kochi**: Aki-shi, Akahisa (*T. Nemoto et al. 9567505*, MAK & SAPT); Hata-gun, Yatsuka-son, Okuyamaji (*H. Yamamoto s. n.*, Jun. 7, 1914, TNS); Takaoka-gun, Hayama, Tokonabe (*A. Takahashi & K. Terada E102*, TUS); Umaji-mura, Yanaze, Senbon-yama (*S. Iwano 10161*, TUS). **Fukuoka**: Amagi City, en route from Nodori to Mt. Kosho (*H. Funakoshi s. n.*, Jul. 28, 1988, CBM); Buzen-si, Mts. Inugatake, en route from Osoyebuchi-dani to Osao-touge (*M. Hotta 6160*, KYO); Hikoyama (*T. Ohba 15911*, KPM); Nakagawa-machi, Kusenbu-yama (*S. Tsutsui 59*, TOFO); Yame-gun, Shimizudera (*S. Okamoto s. n.*, May 9, 1956, KYO). **Saga**: Fujitsu-gun, Shiota-machi (*T. Baba s. n.*, Jun. 9, 1940, TOFO). **Nagasaki**: Ohmura-shi, Kuroki-cho, Kuroki Hatchodani (*K. Yonekura 3650*, TUS). **Kumamoto**: Itsuki-mura (*Unknown collector s. n.*, Jul. 29, 1900, TOFO); Kikuchi-gun, Ohdzu-machi (*Y. Simada 13288c*, KYO). **Ohita**: Kusugun, Kusu-machi (*K. Inami s. n.*, Aug. 7, 1985, CBM). **Miyazaki**: Mt. Kirishima (*T. Makino s.*

n., Aug., 1909, MAK); Kitagou Town, Iyae Valley (*T. Katsuyama s. n.*, May 7, 1998, KPM); Nishi-Usuki-gun, Takachino-cho, Toroku near Iwato (*N. Naruhashi 1420*, KYO). **Kagoshima**: Kajiki (*Unknown collector s. n.*, Mar. 25, 1902, MAK); Ookuchi-shi, Fuke (*M. Okamoto & M. Kato 219*, KYO); Tarumizu, Onobaru (*H. Ohba & J. Murata 9*, KYO).

2. **Phyllanthus oligospermus** Hayata subsp. **donanensis**, subsp. nov. (Fig. 4a)
See the text.

3. **Phyllanthus reticulatus** Poir. (Fig. 4b)
Okinawa: Isl. Hateruma (*Y. Miyagi 6637*, RYU); Is. Iriomote, from Ohtomi to Komi (*M. Furuse 4399*, KPM, MAK, RYU); Isl. Ishigaki-jima, Arakawa (*G. Ikeda 4607*, RYU); Isl. Miyako-jima (*S. Sacaguchi 73*, MAK); Is. Miyako, Hirara-shi, Karimata (*M. Furuse 4604*, KPM); Isl. Miyako, Ohno-sanrin (*Y. Miyagi et al. 37789*, RYU).

5. **Phyllanthus liukiuensis** Hayata (Fig. 4c)
Okinawa: Okinawa-hontoo, Onna-son, Manzamo (*M. Furuse 5521*, KPM); Onnah (*J. Matsumura s. n.*, Aug. 25, 1897, TI).

6. **Phyllanthus lepidocarpus** Siebold & Zucc. (Fig. 5)
Fukushima: Aizu (*Unknown collector s. n.*, Sep. 25, 1908, TNS). **Gunma**: Tatebayashi (*T. Makino s. n.*, 1923, MAK). **Saitama**: Urawa-shi, Hirogayado (*T. Kawasaki 3923*, TNS). **Chiba**: Futtsu-shi, Aoki (*T. Kawana s. n.*, Sep. 19, 1985, CBM); Ichikawa (*K. Matsushima s. n.*, Jul., 1897, TNS); Sakura-shi, Shizu Station (*Teramura s. n.*, Oct. 4, 1996, CBM). **Tokyo**: Isl. Aogasima (*T. Tuyama s. n.*, Jul. 19, 1933, TI); Chichi-shima (*S. Tamaki s. n.*, Aug. 26, 1912, TI); Isl. Miyake-jima (*K. Hayashi 246*, KYO); Setagaya-ku, Setagaya (*S. Suzuki s. n.*, Sep. 18, 1953, TUS). **Kanagawa**: Hiratsuka (*T. Makino s. n.*, Sep., 1905, MAK); Yugawara (*T. Makino s. n.*, Nov. 21, 1937, MAK). **Niigata**: Koshi-gun, Kitatani-mura, Nagino (*Y. Ikegami 9620*, TUS). **Shizuoka**: Fuji City, Koudo, S foot of Mt. Fuji (*F. Konta 13156*, TNS); Ito (*S. Okuyama 19865*, TNS); Iwata-gun, Sakuma-cho, Nakabe (*Sugimoto s. n.*, Nov. 5, 1948, TNS). **Aichi**: Aichi-gun, Tenpaku, Yagoto (*K. Inami s. n.*, Oct. 3, 1958, CBM); Toyokawa, Hirao, Komaba (*T. Ohba s. n.*, Aug. 7, 1950, KPM). **Mie**: Watarai-gun, Shimadzu-mura, Kowaura (*Kuwana s. n.*, 1904, MAK). **Shiga**: Ohtsu-shi, Shigasato (*C. Hashimoto 7340*, TNS). **Kyoto**: Funai-gun, Yagi-cho (*G. Murata 19022*, TNS); Hukutiyama, Mutobe (*M. Togashi s. n.*, Sep. 21, 1949, TI). **Osaka**: Hirakata (*G. Nakai 5085*, KYO); south of Sakai, Toriishi-mura (*K. Seto 3207*, KYO). **Hyogo**: Kasai City (*M. Yanai 15243*, TKPM); Mt. Rokko (*S. Kuriyama s. n.*, Aug. 22, 1928, MAK); Shingu-cho, Kurisu (*M. Yanai 21171*, TNS). **Nara**: Ikoma-gun, Sangô-mura (*T. Kodama 9739*, TNS). **Wakayama**: Kaisou-gun, Okazaki-mura (*S. Sakaguchi s. n.*, Aug., 1914, MAK); Kamitondamachi, Oka (*S. Sugaya & H. Toda s. n.*, Oct. 16, 1957, TUS); Nishimuro-gun, Tanabe (*T. Nakajima s. n.*, Nov. 10, 1925, TI); Insl. Ohsima (*S. Okamoto 213*, KYO); Shingu (*Unknown collector s. n.*, Sep., 1908, MAK). **Shimane**: Nima-gun, Shizuma-mura, Tarumi (*S. Tamaki s. n.*, Oct. 23, 1932, TI). **Okayama**: Kawakami-gun, Chikanori (*Z. Yoshino s. n.*, Oct. 21, 1943, TI). **Hiroshima**: Hiroshima-shi, Nishi-ku, Yokogawa (*S. Suzuki s. n.*, Sep. 28, 1928, TUS). **Yamaguchi**: Hagi (*J. Nikai s. n.*, Oct. 7, 1919, TNS); Tokuyama-shi (*S. Okamoto s. n.*, Oct. 18, 1955, KYO); Yoshiki-gun, Ohuchi, Mihori (*J. Nikai 852*, TI, TNS). **Tokushima**: Kaifu-gun, Mugi-cho (*S. Takafuji 0189*, TKPM); Kyouzai-gun, Kondzisan (*J. Nikai 2469*, TNS). **Ehime**: Iwamatsu-mura (*E. Yamada s. n.*, Nov. 5, 1907, MAK). **Kochi**: Hata-gun, Nakamura-cho (*Y. Kanematsu s. n.*, Aug. 30, 1913, MAK); Kochi (*S. Okamura s. n.*, Aug., 1904, MAK); Sakawa (*T. Makino s. n.*, Oct., 1892, MAK). **Nagasaki**: Goto, Arikawa (*Unknown collector s. n.*, 1904, MAK); Nagasaki (*S. Tamaki s. n.*, Jun. 20, 1910, TI); Isl. Tsushima, Shimoagata-gun, Izuhara-machi (*H. Ohashi & Y. Tateishi 933*, URO). **Kumamoto**: Amakusa Isls., Mt.

Some-ga-take (*S. Saito s. n.*, Oct. 28, 1925, TI); Kamoto-gun, Kutami (*Unknown collector s. n.*, Oct. 7, 1906, MAK); Yatsushiro, Kouda-mura (*Y. Yamada s. n.*, Oct. 25, 1905, MAK). **Ohita**: Beppu-city, Otohara (*G. Murata 12629*, TNS). **Miyazaki**: Minaminaka-gun, Kitagou-son, Inohae (*Unknown collector s. n.*, Aug. 6, 1942, TI); Todoro (*K. Saita s. n.*, Aug. 9, 1891, TNS). **Kagoshima**: Isl. Amamiohshima, Naze–Asato–Kominato–Naze (*Y. Kimura & I. Hurusawa s. n.*, Sep. 9-10, 1940, TI); Annou (*S. Ouchiyama 23*, TNS); near Kagoshima city (*S. Tamaki s. n.*, Oct. 1, 1911, TI); Mt. Kaimon (*K. Kondo 6788*, TI); Kimotsuki-gun, Uchinoura, Koraze (*I. Hurusawa s. n.*, Aug. 5, 1946, TI); Isl. Koshiki-jima (*J. Ohwi s. n.*, Oct., 1928, TNS); Satsuma Peninsula, Kiire (*S. Saito s. n.*, Oct. 15, 1928, TI); Insl. Tokunoshima, Kametoku Isen (*H. Ohba 85*, KYO); Yakushima, Kuriu (*Y. Kudô 7276*, CBM). **Okinawa**: Isl. Iriomote-jima, along Urauchi river (*Y. Kimura & I. Hurusawa s. n.*, Oct. 5-6 or 8, 1940, TI); Isl. Ishigaki-jima, Omoto (*M. Furuse 3996*, SAPT (excl. right plant)); Isl. Kikai-jima, Yamada (*K. Yoshinaga 713*, RYU); Kunigami-gun, Kunigami-son, Uka to Nishi-dake (*G. Murata et al. 56754*, MAK); Isl. Miyako-jima (*Y. Niiro 2431*, RYU); Naha, near Shuri (*Y. Kimura & I. Hurusawa s. n.*, Sep. 15 or 25-30, 1940, TI); Okinawa Isls, Ie Isl. (*H. Ogawa 609*, URO); Isl. Yonaguni-jima (*M. Furuse 1336*, RYU).

7. **Phyllanthus embergeri** Haic. & Rossign. (Fig. 6a)

Okinawa: Isl. Iriomote, near Sonou (*Y. Kimura & I. Hurusawa s. n.*, Oct. 4 or 14, 1940, TI); Is. Ishigaki, Omoto (*M. Furuse 3996*, KPM, SAPT (excl. left plant)); Ishigaki Isl., Ishigaki-shi, Takeda (*T. Kurosawa & S. Matsumura 20041*, FKSE, TI, TUS); Yaeyama (*Unknown collector s. n.*, Aug., 1909, MAK).

8. **Phyllanthus urinaria** L. subsp. **nudicarpus** Rossign. & Haic. (Fig. 6b)

Okinawa: Isl. Hateruma (*Y. Miyagi 6650*, RYU); Iriomote, Ohtomi (*K. Tokeshi 350*, RYU); Is. Miyako, Hirara-shi (*Y. Miyagi et al. 36672*, RYU).

9. **Phyllanthus amarus** Schum. (Fig. 6c)

Okinawa: Isl. Ishigaki (*T. Amano 5861*, TNS); Ishigaki Isl., Ishigaki-shi, Kabira (*T. Kurosawa & S. Matsumura 20026*, FKSE, TI, TUS); Is. Ishigaki, Miyara-river-mouth (*M. Furuse 3824*, KPM, RYU, SAPT); Isl. Yonaguni (*Hatusima et al. 35496*, RYU).

10. **Phyllanthus debilis** Klein ex Willd. (Fig. 7)

Tokyo: Chichijima, near Suzaki (*Y. Momiyama et al. s. n.*, Mar. 4, 1972, MAK); Hahajima Isl., Omotohama (*H. Kanai & M. Ono 764292*, MAK); Isl. Nakaiwo (*T. Nakai s. n.*, Jun. 24, 1919, TI); Ogasawara, Omura (*B. Kawate s. n.*, Apr., 1906, TI). **Okinawa**: Isl. Amami-oshima, Naze city (*H. Ohno s. n.*, Jul. 20, 1968, MAK, TI); Ishigaki Isl., Ishigaki-shi, Sokoji Beach (*T. Kurosawa & S. Matsumura 20028*, CBM, FKSE, TI, TUS, URO); Is. Ishigaki, south-side foot of Mt. Omoto (*M. Furuse 308*, KPM, RYU); Kerama-jima, Zamami-mura (*T. Yamazaki s. n.*, Oct. 12, 1972, TI); Isl. Kitadaito-jima (*Hatusima 33825*, RYU); Is. Minami-daitohjima (*Y. Miyagi 8230*, KYO, MAK, RYU, TI, TNS).

11. **Phyllanthus ussuriensis** Rupr. & Maxim. (Fig. 8a)

Hokkaido: Esashi (*S. S. 14522*, SAPT). **Aomori**: Aomori (*N. Kinashi s. n.*, Oct., 1910, KYO); Shimokita-gun, Sai-mura, Harata (*O. Mori s. n.*, Sep. 8, 1956, MAK); near Shiriuchi (*Unknown collector s. n.*, Aug. 20, 1904, MAK). **Iwate**: Hanamaki-shi, Nishi-miyanome, Kimigasawa, Hanawatsutsumi (*K. Hara et al. 222*, TUS); Koiwai (*S. Murai s. n.*, Sep. 29, 1930, TUS); Mizusawa (*H. Iwabuchi 1436*, TUS). **Miyagi**: Kakuda-city, Shimada, Takase-pass (*T. Mori 3802*, TUS); Insula Kinkazan (*S. Sugaya et al. s. n.*, Aug. 20, 1955, TUS); Monou-gun, Kahoku-cho, Iino-gawa River (*T. Naito s. n.*, Oct. 16, 1974, TUSG); Sendai, Higashisendai (*Y. Nakamura s. n.*, Sep. 12, 1956, TUS). **Akita**: Hiraka-gun, Kakumagawa (*M. Shimamori s. n.*, Oct. 20, 1906, MAK); Ohdate-machi, Nagane-yama (*K. Hisauchi s. n.*, Aug. 12, 1930, TNS). **Yamagata**: Akumi-gun, Kannonji (*I. Sato s. n.*, Sep., 1910, MAK); Higashimurayama-gun, Takadama

(*Ohuchi s. n.*, Sep., 1905, MAK). **Fukushima**: Nishishirakawa-gun, Koseki-mura (*N. Imai s. n.*, Aug. 25, 1931, TI); Ohnuma-gun, Nishikawa-mura, Miyashita (*T. Saito 14526*, SAPT); Tonokuchi (*S. Tamaki s. n.*, Aug. 26, 1913, TI); Yumoto (*Unknown collector s. n.*, Aug. 9, 1879, TI). **Tochigi**: Kawachi-gun, Hiraishiyama (*H. Nakamura s. n.*, Jul. 10, 1928, TNS); Nikko, Sannai (*H. Ito s. n.*, 1931, TI). **Gunma**: Agatsuma-gun, Agatsuma-machi, Haramachi (*K. Masuda 836*, TNS); Tatebayashi City (*T. Makino s. n.*, 1923, KYO). **Saitama**: Koma-mura, Monomiyama (*K. Hisauchi 2446*, TI); Minamisaitama-gun, Sakurai-mura (*R. Ito s. n.*, Sep. 23, 1913, MAK). **Chiba**: Chôshi, Nanatsuike (*Y. Fukuda s. n.*, Sep. 22, 1968, TI); Kashiwa-shi, Sakaine (*Y. Saito s. n.*, Aug. 13, 1995, CBM); Kimitsu-shi, Tsukige, Kameyama-ko (*M. Tanabe s. n.*, Nov. 14, 1991, CBM); Yachimata-machi (*C. Suzuki s. n.*, Sep. 24, 1940, TUS). **Tokyo**: Hachioji-shi, Higashi-nakano (*S. Kobayashi et al. s. n.*, Aug. 21, 1987, MAK); Kamimeguro (*H. Hara s. n.*, Jul. 17, 1931, TI). Kanagawa: Ashigarashimo-gun, Minamiashigara-machi (*S. Kobayashi 26222*, MAK); Kamakura (*Y. Momiyama 135*, TI). **Niigata**: Higashikanpara-gun, Ryoukanose-mura, Kanose (*T. Nakai & Maruyama s. n.*, Oct. 8, 1950, TNS); Kariwa-gun, Kamioguni-mura (*S. Iwano 4056*, TUS); Muikamachi (*N. Tanaka & M. Takahashi 97-42*, MAK). **Toyama**: Yatsuo, Kakuma-mura (*Unknown collector s. n.*, 1903, MAK). **Ishikawa**: Kanazawa-shi, Sengokumachi (*N. Satomi 14042*, MAK). **Fukui**: Ohno-gun, Sakadani-mura (*Y. Hori 162*, TNS); Onyû-gun, Nadashô-son, Kurose to Hisasaka (*M. Okamoto 2262*, KYO). **Yamanashi**: East slope of Mt. Yatsuga-take, Ohizumi-mura (*C. Ohkawa s. n.*, Sep. 7, 1969, TNS); Minamitsuru-gun, Oshino-mura, Uchino (*Y. Tateishi 715125*, TUSG). **Nagano**: Karuizawa, Nishinozawahara (*K. Sato s. n.*, Aug. 28, 1954, TI); Shimoina-gun, Tatsuoka-mura (*Takahashi s. n.*, Sep. 25, 1955, TNS); Shinonoi, Kamiishikawa (*M. Minemura s. n.*, Sep. 21, 1953, MAK). **Gifu**: Gujou-gun, Ohmami (*S. Takahashi s. n.*, Jul. 26, 1906?, MAK); Ohnada (*M. Honda s. n.*, Aug. 16, 1925, TI). **Shizuoka**: Amagi-touge (*H. Kanai s. n.*, Oct. 16, 1952, TI); Iwata-shi (*S. Muramatsu s. n.*, Aug. 17, 1956, TI); the Asagiri Plateau, northern part of Fujinomiya-shi, western foot of Mt. Fuji (*F. Konta 8124*, TNS). **Aichi**: Nagoya City (*T. Makino s. n.*, Sep., 1940, MAK); Toyohashi-shi, Ishimaki (*K. Torii s. n.*, Aug. 12, 1951, KYO). **Mie**: Kumano-shi, Arima-cho (*T. Koide 293*, KYO). **Shiga**: Higashiasai-gun, Asai-machi, Takayama, at the south foot of Mt. Kanakuso, en route from Futamata-bashi to Myoto-taki (*N. Fukuoka 5307*, KYO); Kouka-gun, Kouka-cho, Aburahi (*S. Okamoto s. n.*, Oct. 2, 1952, TNS); Ohtsu (*I. Sono s. n.*, Aug. 1, 1906, TNS). **Kyoto**: Ayabe-shi, Tachi-cho to Iden (*G. Murata et al. 33990*, KYO); Kameoka-shi, Hodzu-cho, Taniyama-ike (*S. Tsugaru 27193*, KYO). **Osaka**: Mt. Kongo-san, from Chihaya to Fushimi-toge (*G. Murata 19044*, KYO). **Hyogo**: Hikamigun, Aogakityo, Mt. Awagayama (*G. Murata 14221*, KYO); Kanzaki-gun, Niino-mura (*Hashimoto s. n.*, Sep. 14, 1902, MAK); Kobe-shi, Nishi-ku, Oshibedani, Kinkouji (*T. Kobayashi 9444*, MAK); Mihara-gun, Seidan-cho (*T. Shimizu 82-96*, KYO); Sayou-gun, Koudzuki-cho, Kamikoudzuki (*M. Yanai 17306*, TKPM). **Wakayama**: Kaisou-gun, Okazaki-mura (*S. Sakaguchi s. n.*, Sep. 15, 1912, MAK); Kushimoto-chyo, Shionomisaki (*G. Murata 13839*, KYO); Nishimuro-gun, Nakaheji-cho, Ouchigawa (*G. Murata 19630*, KYO). **Shimane**: Hiyama-mura (*S. Hara s. n.*, Sep. 21, 1936, TNS). **Okayama**: Nishiawakura-mura, Nagao (*T. Sugawara s. n.*, Aug. 21-22, 1989, MAK); Shidzutani (*T. Makino s. n.*, Aug., 1906, MAK); Joubou-gun, Yagawa (*Z. Yoshino s. n.*, MAK). **Hiroshima**: Miyoshi City, Higashisakaya-machi (*N. Fukuoka et al. 2787*, KYO). **Yamaguchi**: Tokuyama (*S. Okamoto s. n.*, Oct. 5, 1956, TNS); Ube-shi, Nukumi (*T. Yamada s. n.*, Sep. 21, 1975, TUS). **Tokushima**: Kaifu-gun, Mugi-cho (*S. Takafuji 0159*, TKPM); Miyoshi-gun, Ikeda-cho, Hashikurayama (*T. Inobe s. n.*, Sep. 3, 1971, TKPM); Myouzai-gun, Kamiyama-cho, Asahinomaruyama (*Collector unknown 19*, TKPM). **Kagawa**: Ayagami-cho, Nagae (*T. Sugawara & A. Makimoto s. n.*, Oct. 2, 1988, MAK). **Ehime**: Nii-gun, Kanbe (*K. Ochi s. n.*, Aug. 15, 1935, TUS); Ohse-mura, Gouji (*T. Imaizumi 147*, KYO). **Kochi**: Hata-gun, Nakamura, Doumeki (*Y. Kanematsu s. n.*, Jun. 27, 1913?, MAK); Iwamiji (*T. Makino s. n.*, Oct. 22, 1892, MAK); Nagaokagun, Mt. Shiragayama (*G. Murata 10894*, KYO). **Fukuoka**: Buzen-si, Mts. Inugatake, en route from Osorebuchi-dani to Osao-touge (*M. Hotta 6146*, KYO). **Nagasaki**: Goto, Isl. Fukue-jima, Nanatsudake (*S. Saito 1513*, TI); Katsumoto-cho (*T. Shinagawa s. n.*, Sep. 25, 1955, TNS); Sasebo-shi, Satoyoshi-cho, NE. side of Gomitani-ike (*K. Yonekura 92784*, TUS). **Kumamoto**: Amakusa, near Shimoura (*S. Saito 26*, TI); Aso-gun, Yamanishi-mura (*H. Takahashi s. n.*, Sep. 8, 1935, TI); Houtaku-gun, Kipousan (*H. Kozuma s. n.*, Sep. 3, 1905, MAK). **Miyazaki**: Hyuuga-shi, Nishikawauchi (*J. Murata 8536*, TI). **Kagoshima**: Kagoshima, Arata (*S. Ide s. n.*, Dec. 16, 1931, TNS); Kokubu-shi, Makinouchi (*Y. Tateishi et al. 45452*, URO); Lake Imuta (*S. Hatusima & S. Sako 25220*, MAK); Isl. Mage-jima (*S. Ouchiyama s. n.*, Oct. 20, 1957, TNS).

12. **Phyllanthus simplex** Retz. (Fig. 8b)

Okinawa: Isl. Ishigaki-jima, Miyaragawa (*Hatusima 33223*, RYU); Kobama Jima, between O Take and Fune Saki (*F. R. Fosberg 37939*, TI); Isls. Miyako, Isl. Terama (*Y. Miyagi 7008*, RYU); Miyako Jima, north side of Kubukawa tidal lake (*F. R. Fosberg 38168*, TI).

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